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# Regulatory Burden and Poor Defense Acquisition Program Outcomes

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# Agenda

- **Overview**
- **Previous Work**
- **Method**
- **Data**
- **Models**
- **Results**
- **Interpretation**
- **Conclusions**
- **Future Work**

# Overview

- **Traditional metrics of program performance have been cost, schedule and system requirements, relative to the APB baselines set at a previous point in time**
  - Some programs perform well, but most do not
- **What is the impact of defense acquisition regulation or reforms?**
  - **Previously modeled as the correlation and direction of change for a key performance metric for a program in the years following the introduction of the oversight or reform change**
  - **Provides absolutely no insight on the actual mechanism behind the implied causality**
    - Hypothetical: What went on (that was internal to programs) that caused cost growth to slow after FASA in 1994, or to show no effect from Packard Commission reforms in 1987 ?

# Overview

- **We take a new approach here, where a mechanism is already in place to create program changes**
  - **DAES reviews and requirements for corrective actions**
    - Recurring program assessment ratings
    - Defined corrective steps and timeline
    - Follow up occurs in the next DAES review
- **The following models will determine if regulation, oversight and a variety of other factors produce desired or expected results on the ratings process - and drive the corrective steps that have to be taken by program management before the next review.**

# Method

- Like a report card, DAES program assessment reviews carry consequences for defense programs:\*)
  - Green
  - Yellow
  - Red
- If regulatory and oversight actions, or cost performance, etc support a Green rated program continuing to be Green rated, this is precisely the desired result.
- On the other hand, if regulatory or oversight actions drive a Green rated program toward Yellow or Red, then the corrective mechanism comes into play and corrections must be made – and the PARCA / DAES *Deskbook* spells out the requirements and time frame.



\*) Department of Defense (2012). Defense Acquisition Executive Summary Assessment Deskbook. Washington, DC. OUSD/AT&L Performance Assessment and Root Cause Analysis. Version 14. December.

# Method

- **Ordered logit models**
  - Efficiently use the information contained in the ranked values of dependent (response) variable, i.e. Red << Yellow << Green
  - Response (dependent ) variable is recoded 1,2,3, and the functional form assumes a logistically distributed error term
  - **Four models**
    - Focus is on two DAES rating categories (Cost and Schedule) – from two points of view, Program Management and OSD
- **Exploratory work also modeled binary recodes of assessment rating variables to understand contrasts, i.e., program was either green (=1) in time period  $j$  or it was not (=0)**
  - Several variants on same principle
  - Points the way for future work to refine our understanding of impact of breach run-in and breach recovery, funding instability, rebaselining, cancellation

# Data



Programs have been  
DAES reviewed and rated

F-22 Raptor				
	PM-Cost	PM-Schedule	OSD-Cost	OSD-Schedule
2001	Yellow	Red	Red	Red
2002	Red	Red	Red	nr
2003	Yellow	Red	Red	Yellow
2004	Yellow	Red	Red	Yellow
2005	Yellow	Yellow	Yellow	Yellow
2006	Yellow	Yellow	Yellow	Green
2007	Green	Yellow	Green	Green
2008	Green	Green	Green	nr

Assemble DAES Reviews

F-22 Raptor								
	PM-Cost	PM-Schedule	OSD-Cost	OSD-Schedule	Original APUC	Service	ACAT	AF GS1102
2001	Yellow	Red	Red	Red	89.3	AF	1D	4614
2002	Red	Red	Red	nr	89.3	AF	1D	4691
2003	Yellow	Red	Red	Yellow	89.3	AF	1D	4745
2004	Yellow	Red	Red	Yellow	89.3	AF	1D	4398
2005	Yellow	Yellow	Yellow	Yellow	89.3	AF	1D	4783
2006	Yellow	Yellow	Yellow	Green	89.3	AF	1D	4940
2007	Green	Yellow	Green	Green	89.3	AF	1D	4740
2008	Green	Green	Green	nr	89.3	AF	1D	4700

Integrate program-varying data with  
time-varying data for statistical  
modeling on **N** programs



# Data

- **Time series, cross sectional panel, 2001-2013**
  - **Program Manager (PM) assessment ratings for Cost and Schedule categories**
  - **OSD DAES review team assessment ratings for Cost and Schedule categories**
- **Program Selection:**
  - **57 major defense programs included in sample**
  - **Minimum 3, maximum 13 years. Average 8-9 years.**
  - **19 (+/-) MDAPs sampled per service**
- **Regulatory data methodology followed the Krieger and Pritchard\* method for counting acquisition regulation measures.**
- **Service specific manpower counts (GS1102 contracting officers).**
- **Program specific data from SARs, APBs.**

\* John Kreiger and John Pritchard (2009) "Acquisition Reform and the Golf Ball." Contract Management 49 (12), 18-27. December.

# Programs

	Service branch	MDAP Status	ACAT	Joint Capability Area	Original APB Year
AEHF	Air Force	Active	ID	Net Centric	2001
AGM-88E AARGM	Navy	Active	IC	Force Application	2003
AH-64E	Army	Active	IC	Force Application	2006
AMRAAM AIM-120	Air Force	Active	IC	Force Application	1988
ARH-70 Arapaho	Army	Cancelled	ID	Force Application	2005
ASDS	Navy	Cancelled	ID	Force Application	2003
ATIRCM-CMWS	Army	Completed	IC	Protection	1996
B-1B CMUP	Air Force	Completed	ID	Force Application	1996
B-2 RMP	Air Force	Completed	IC	Force Application	2004
C-17A	Air Force	Completed	IC	Logistics	1988
C-5 AMP	Air Force	Completed	IC	Logistics	2006
C-5 RERP	Air Force	Active	IC	Logistics	2001
CH-47F	Army	Active	IC	Logistics	1998
CH-53K	Navy	Active	ID	Logistics	2005
CVN-78	Navy	Active	ID	Force Application	2004
DDG-1000	Navy	Active	IC	Force Application	2005
DDG-51	Navy	Active	ID	Force Application	1988
E-2D AHE	Navy	Active	ID	Command & Control	2003
EA-18G	Navy	Active	IC	Force Application	2003
EELV	Air Force	Active	ID	Force Application	2004
Excalibur	Army	Active	IC	Force Application	2004
F-22 Raptor	Air Force	Active	IC	Force Application	1992
F-35 JSF	DOD	Active	ID	Force Application	2001
FAB-T	Air Force	Active	ID	Net Centric	2007
FCS	Army	Cancelled	ID	Force Application	2003
FMTV	Army	Completed	IC	Logistics	1988
GMLRS - GMLRS AW	Army	Active	IC	Force Application	1998
JASSM	Air Force	Active	ID	Force Application	2011
JDAM	Air Force	Active	IC	Force Application	1995
JLENS	Army	Active	IC	Protection	2005
JTN	Army	Active	ID	Net Centric	2002
JTRS AMF	Army	Active	ID	Net Centric	2008
JTRS HMS	Army	Active	ID	Net Centric	2004
LCS	Navy	Active	ID	Force Application	2011
LHA-6	Navy	Active	ID	Force Application	2006
LPD-17	Navy	Active	IC	Force Application	1996
MH-60S	Navy	Active	IC	Force Application	1998
MQ-1C Grey Eagle	Army	Active	IC	Battlespace Awareness	2011
MQ-9 Reaper UAS	Air Force	Active	IC	Battlespace Awareness	2012
MUOS	Navy	Active	ID	Net Centric	2004
NAVY ERP	Navy	Active	.	Logistics	2004
NPOESS	Air Force	Cancelled	IC	Battlespace Awareness	2002
P-8A Poseidon	Navy	Active	ID	Force Application	2004
Patriot MEADS CAP	Army	Active	ID	Protection	2004
RAH-66 Comanche	Army	Cancelled	ID	Force Application	1988
RQ-4A-B Global Hawk	Air Force	Active	ID	Battlespace Awareness	2001
SBIRS-High	Air Force	Active	ID	Battlespace Awareness	1996
SDB I	Air Force	Completed	.	Force Application	2003
SM-6	Navy	Active	ID	Protection	2004
SSN 774	Navy	Active	ID	Force Application	1995
Stryker	Army	Completed	IC	Force Application	2000
Tactical Tomahawk	Navy	Active	IC	Force Application	1999
UH-60A	Army	Active	IC	Logistics	2002
V-22	Navy	Active	IC	Logistics	1988
VTUAV	Navy	Active	IC	Battlespace Awareness	2006
WGS	Air Force	Active	IC	Net Centric	2000
WIN-T	Army	Restructured	ID	Net Centric	2007

# Models and Results

- **Four models, described by the dependent variable we wish to explain**
  - *Program Manager team Cost assessment of the program*
  - *OSD DAES Review team Cost assessment of the program*
  - *Program Manager team Schedule assessment of the program*
  - *OSD DAES Review team Schedule assessment of the program*
- **Reading the table on the next slide:**
  - **Negative sign on coefficient estimates indicates that an increase in the explanatory variable correlates with worse ratings (yellow or red); a positive sign predicts better ratings**
  - **Statistical significance is noted by asterisks – the more asterisks, the higher the statistical significance**

# Models and Results

## Key:

“+” correlates with improved ratings;  
 “-” correlates with worsened ratings;  
 asterisks show level of significance;  
 “N” is available observations used by model.

Model	(1)	(2)	(3)	(4)
Dependent Variable	PM-Cost	OSD-Cost	PM-Schedule	OSD-Schedule
Explanatory Variables:				
<i>NDAA Sections (1Lag)</i>	+ **	+ **	-	-
<i>GS1102 Workforce (1Lag)</i>	-	-	-	-
<i>GS1102 Workforce (2Lag)</i>	+ *	+	+	-
<i>GAO Report</i>	- *	-	- ***	+
<i>DARS Notifications (1Lag)</i>	+	.	-	+
<i>APUC Growth (Pct)</i>	- *	+	-	- **
<i>Acquisition workforce, US</i>	-	+	+ *	+ *
<i>MSB to MSC (months)</i>	- **			-
<i>PM Cost Red (1Lag)</i>	- **			
<i>PM Cost Yellow (1Lag)</i>	- **			
<i>OSD Cost Red (1Lag)</i>		- ***		
<i>OSD Cost Yellow (1Lag)</i>		- ***		
<i>PM Sched Red (1Lag)</i>			- ***	
<i>PM Sched Yellow (1Lag)</i>			- ***	
<i>OSD Sched Red (1Lag)</i>				- ***
<i>OSD Sched Yellow (1Lag)</i>				- ***
<i>Munition</i>	+ **			+ *
<i>Vehicle</i>	- ***			
<i>Missile</i>	+ **			
<i>Aircraft</i>	+			
<i>UAV/UAS</i>		- **	-	- ***
<i>Helicopter</i>			- *	-
<i>Original APB Year</i>	- **		-	- **
<i>ACAT 1D Program</i>				- ***
<b>N</b>	<b>309</b>	<b>390</b>	<b>423</b>	<b>248</b>

# Interpretation

- Previous period rating is a factor, as expected, but the models clearly tell us that there is a bigger story in ratings program performance
- Regulation (NDAA) as we tested it here, was significant – but not DARS notifications.
  - Better approach would use qualitative distinctions on type and specificity of regulation
- Oversight *matters*
  - GAO mention of a program in “*Assessments of Selected Weapons Programs...*”
  - ACAT 1D and level of program decisional authority matters



# Interpretation

- **System type**
  - **Clear relationship of some system types with poorly rated programs (vehicles, UAV/UAS) or better rated programs (munitions, missiles)**
- **Supports and validates the significance of cost growth and schedule slip as concerns to the assessment teams**
- **Obvious independence of viewpoints not only between Cost and Schedule reviews, but also, between the PM team and the OSD team reviewers (this is a good thing)**

# Conclusion

- **Models suggest a better way to evaluate if process or oversight reform works**
  - *There is a closed loop feedback mechanism in place, with periodic objective review by experienced review teams.*
  - *The DAES review assessment rating process holds promise for suggesting why a reform works – or doesn't*
- **Oversight does matter – and apparently, rather than being a burden, may efficiently drive program improvements**
- **Econometric modeling lesson is that this is opportunity for better understanding of cause, effect, and explanation of defense acquisition improvements like Better Buying Power**



# Future Direction

- Program database continues to grow after we closed the data set for this study
- Expanding sample allows for work on
  - *Program phase (EMD, Production); cancelled and restructured programs; Nunn-McCurdy process on program outcomes*
  - *Frequency of rebaselining and program quality*
  - *Assessment ratings on Funding and System Requirements (“Performance”)*
- Fix shortcomings on regulatory, oversight and manpower data we were unable to obtain
- Add program specific and period event data
- Expand on testing and insights from other modeling methods